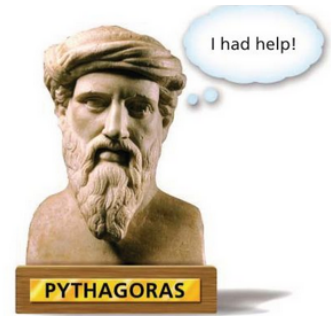
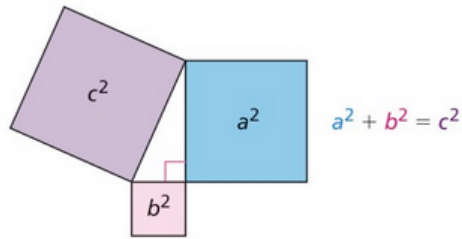


# Pythagorean Theorem

The area of the square on the hypotenuse of a right triangle is equal to the sum of the squares on the legs.



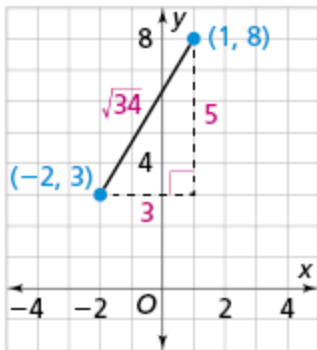
Important Note: The Pythagorean Theorem only applies to RIGHT triangles. There are some important terms we need to know first.

In the Pythagorean Theorem, a and b represent the legs and c represents the hypotenuse.



$$\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$$

Using the Pythagorean Theorem to find distance: You can use the Pythagorean Theorem to find the distance between two points by making a right triangle.



To find the diagonal length in the picture:

1. Make a right triangle using the diagonal as the hypotenuse.
2. Count the vertical and horizontal distances.
3. Use the Pythagorean Theorem to solve for the missing piece.

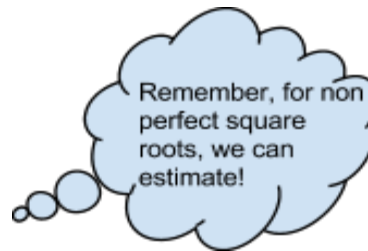
$$a^2 + b^2 = c^2$$

$$3^2 + 5^2 = c^2$$

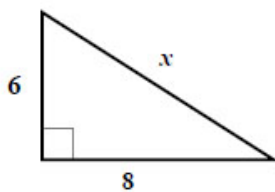
$$9 + 25 = c^2$$

$$34 = c^2$$

$$\sqrt{34} = c$$



Using the Pythagorean Theorem to find missing side lengths of a right triangle.



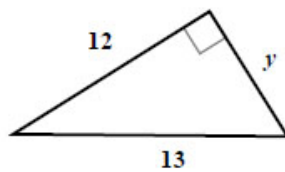
$$6^2 + 8^2 = x^2$$

$$36 + 64 = x^2$$

$$100 = x^2$$

$$\sqrt{100} = \sqrt{x^2}$$

$$x = 10$$



$$12^2 + y^2 = 13^2$$

$$144 + y^2 = 169$$

$$y^2 = 25$$

$$\sqrt{y^2} = \sqrt{25}$$

$$y = 5$$